

## CLAIMS

That which is claimed is:

1. A method of establishing an electrical connection between a recombinant  
5 mammalian cell and a myocardial cell, the method comprising:  
    contacting a myocardial cell with a recombinant mammalian cell genetically  
    modified to produce a connexin protein, said contacting being in a manner sufficient to  
    provide for production of an electrical connection between the myocardial cell and the  
    recombinant cell;  
10      wherein an electrical connection between the recombinant cell and the myocardial  
    cell is established.
2. The method of claim 1, wherein the recombinant cell is selected from the group  
consisting of a skeletal muscle cell, a stem cell, a fibroblast, and a cardiac cell.
- 15 3. The method of claim 1, wherein the recombinant cell is a skeletal muscle cell.
4. The method of claim 3, wherein the skeletal muscle cell is an adult skeletal  
muscle cell.
- 20 5. The method of claim 3, wherein the skeletal muscle cell is a myoblast cell.
6. The method of claim 1, wherein the connexin protein is a connexin 43 protein.
- 25 7. A method of claim 1, wherein said contacting comprises implanting the  
recombinant cell into myocardial tissue of a subject.
8. The method of claim 1, wherein after the electrical connection between the  
recombinant cell and the myocardial cell is established, the recombinant cell has similar  
30 conductive characteristics similar to the myocardial cell.
9. A method of establishing an electrical connection between a recombinant skeletal  
muscle cell and a myocardial cell, the method comprising:

contacting a myocardial cell with a recombinant skeletal muscle cell genetically modified to express a connexin protein, said contacting being in a manner sufficient to provide for production of an electrical connection between the myocardial cell and the recombinant skeletal muscle cell;

5            wherein an electrical connection between the recombinant skeletal muscle cell and the myocardial cell is established.

10           10. The method of claim 9, wherein the skeletal muscle cell is an adult skeletal muscle cell.

11. The method of claim 9, wherein the skeletal muscle cell is a skeletal myoblast cell.

15           12. The method of claim 9, wherein after the electrical connection between the recombinant cell and the myocardial cell is established, the recombinant cell has similar conductive characteristics as the myocardial cell.

13. A method of establishing an electrical connection between a recombinant skeletal muscle cell and a myocardial cell, the method comprising:

20           contacting a myocardial cell with a recombinant skeletal myoblast cell genetically modified to express a recombinant connexin 43 protein, said contacting being in a manner sufficient to provide for production of an electrical connection between the myocardial cell and the recombinant skeletal myoblast cell;

25           wherein an electrical connection between the recombinant skeletal myoblast cell and the myocardial cell is established so that the recombinant skeletal myoblast cell has similar conductive characteristics as the myocardial cell.

14. A method for treating a cardiac conduction disturbance in a host, the method comprising:

30           introducing into cardiac tissue of a host a therapeutically effective amount of a recombinant mammalian cell, which recombinant cell is genetically modified to express a connexin protein, said introducing being effective to establish an electrical connection between the recombinant cell and a myocardial cell of the host cardiac tissue;

wherein the cardiac conduction disturbance in the host is treated.

15. The method of claim 14, wherein the recombinant cell is selected from the group consisting of a skeletal muscle cell, a stem cell, a fibroblast, and a cardiac cell.

16. The method of claim 14, wherein the recombinant cell is a skeletal muscle cell.

17. The method of claim 16, wherein the skeletal muscle cell is an adult skeletal muscle cell.

18. The method of claim 16, wherein the skeletal muscle cell is a myoblast cell.

19. The method of claim 14, wherein the connexin protein is a connexin 43 protein.

20. The method of claim 14, wherein said introducing comprises implanting the recombinant cell into an infarct region of the cardiac tissue.

21. The method of claim 14, wherein the recombinant cell is autologous to the host.

22. A method for treating a cardiac conduction disturbance in a mammalian host, the method comprising:

introducing into cardiac tissue of the host a therapeutically effective amount of a skeletal muscle cell genetically modified to express a connexin 43 protein, said introducing being effective to establish an electrical connection between the introduced recombinant skeletal muscle cell and a myocardial cell of the host cardiac tissue;

wherein the cardiac conduction disturbance is treated.

23. The method of claim 22, wherein the skeletal muscle cell is an adult skeletal muscle cell.

24. A method of claim 22, wherein the skeletal muscle cell is a myoblast cell.

25. The method of claim 22, wherein said introducing comprises implanting the recombinant cell into an infarct region of the cardiac tissue.

26. The method of claim 22, wherein the recombinant skeletal muscle cell is autologous to the host.